

Remarks

Claims 1-32 were originally filed in this application.

Claims 1-14 and 17-30 were previously withdrawn from consideration as being directed to non-elected inventions without prejudice or disclaimer.

No claims are currently amended.

No new claims are added.

No claims are currently canceled.

As a result, independent claims 15, 16, 31, and 32 are pending for examination.

No new matter has been added.

Rejections Under 35 U.S.C. § 103

Claims 15, 16, 31 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the disclosure of Mir in U.S. Patent No. 6,296,751 (hereinafter “Mir”).

Applicants disagree that the respective subject matter of each of independent claims 15, 16, 31, and 32 would have been obvious over the disclosure of Mir.

Mir discloses an electrodeionization apparatus with scaling control. In one embodiment that seeks to control scaling, Mir provides an electrodeionization apparatus having multi-stage concentrating compartments. Mir also discloses, with reference to FIGS. 4 and 13 thereof (reproduced below), an electrodeionization stack 110 of alternating diluting compartments D and concentrating compartments C defined between alternating anion permeable membranes 116 and cation permeable membranes 118, and spaced from a cathode 112 and an anode 114. (Mir at column 6, line 66 to column 7, line 9 and at column 10 lines 41 *et seq.*)

Mir utilizes membranes in the concentrate compartment in an attempt to keep calcium and bicarbonate away from each other whereas some aspects of this invention seek to modify pH.

Mir does not disclose or suggest any of an electrochemical device comprising a compartment comprising electroactive media that is substantially free of anion exchange resin

and bounded by anion-selective membranes on each side thereof; an electrochemical device comprising a compartment consisting essentially of cation exchange resin and anion-selective membranes; a method of facilitating liquid treatment comprising providing an electrochemical device comprising at least one compartment that is at least partially filled with cation exchange resin and bounded by anion-selective membranes on each side thereof; and a method of facilitating liquid treatment comprising providing an electrochemical device comprising a compartment consisting essentially of cation exchange resin and anion-selective membranes.

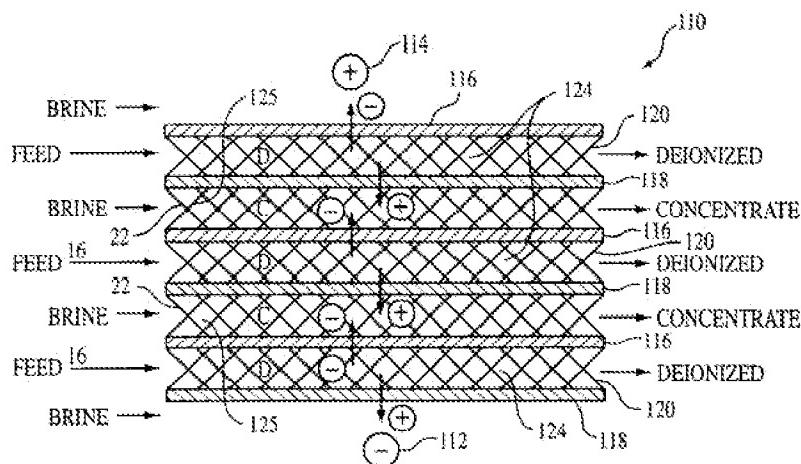


FIG. 4

Indeed, no reasoned technical explanation as to why one skilled in the art would have modified the configurations of Mir into any of the subject matter presently claimed. A statement that “[o]ne can use the various membranes and layers in the concentrating channels in single stage electrodeionization or in two-stage electrodeionization to provide even further improvements in reduced scaling”¹ cannot support the motivation for a *prima facie* case of obviousness because there would have been no reasonable expectation that any of the random configurations would perform satisfactorily, which leads to the conclusion that the rejection is impermissibly based on hindsight. Indeed, it is mere conjecture to presume that one skilled in the art would have modified the apparatus of Mir into the devices and methods in the manner presently claimed without further technical clarification as to the resultant transport kinetics and accompanying expected benefits.

Further, one skilled in the art would not have modified Mir's disclosure and arrive at the electrochemical device or method of facilitating liquid treatment in the manner recited in independent claims 15, 16, 31, and 32 because Mir's apparatus relies on the controlled selective ability of the anion and cation permeable membranes to permit transport therethrough. For example, Mir, with reference to FIG. 13, shows a stack 230 that relies on countercurrent flow. The diluting channel is bounded by an anion-selective membrane and a cation-selective membrane. The concentrating channel has two compartments: the lower compartment has cation exchange resin and is bounded by a cation-selective membrane and an anion-selective membrane; and the upper compartment has anion exchange resin and is bounded by the cation-selective membrane and another cation-selective membrane. (Mir at column 10, lines 41 *et seq.*) Modifying the configuration of any of the diluting or concentrating compartments of the apparatus of Mir would have prevented the controlled transport of species that is critical to Mir's invention, *i.e.*, separating the calcium from the inorganic carbon which would otherwise form scale.

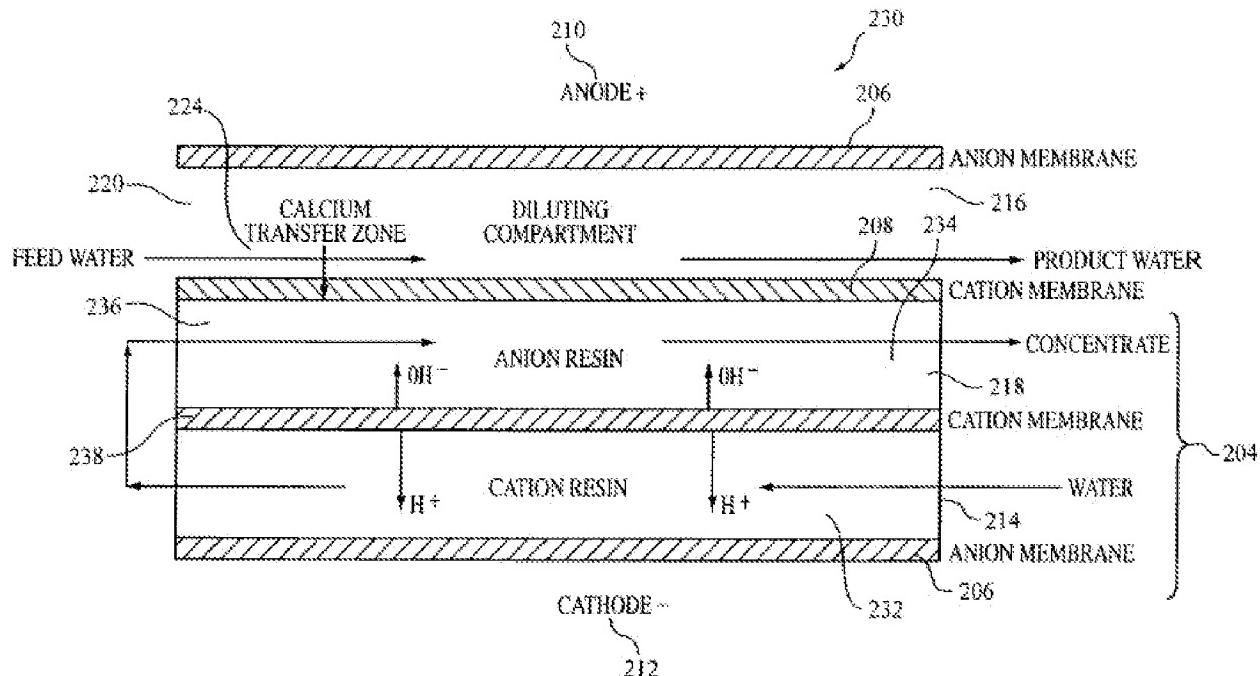


FIG. 13

¹ Mir at column 4, lines 37-41.

Therefore, because no proper *prima facie* case of obviousness has been shown and any alleged modification to the disclosure of the reference would have vitiated the principles of operation required by the reference, the rejection of independent claims 15, 16, 31, and 32 as would have been obvious over the disclosure of Mir is improper.

Accordingly, reconsideration and withdrawal of the rejection of independent claims 15, 16, 31, and 32 under 35 U.S.C. § 103 is respectfully requested.

Conclusion

This application is in condition for allowance; a notice to this effect is respectfully requested. If the examiner believes, that the application is not in condition for allowance, the examiner is requested to call Applicants' attorney at the telephone number listed below.

If this Response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this Response, including an extension fee that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50/0214 (Ref. No. I0168-707719).

Respectfully submitted,
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